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CGS SW Release Notes

Kurzbeschreibung:
Abstract:

This document issue provides the description of the CGS SW release 6.3.3 based on CGS 6.3.2 release.

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DCR Daten/Dokument-Änderungsnachweis/Data/Document Change Record

Überarbeitung Revision	**Datum** Date	**Betroffener Abschnitt/Paragraph/Seite** Affected Section/Paragraph/Page	**Änderungsgrund/Kurze Änderungsbeschreibung** Reason for Change/Brief Description of Change
2/-	30.04.2004	All	Initial release (6.2.0)
2/A	13.05.2004	All	Bug Fixes (6.2.0.1)
2/B	07.07.2004	All	Extended Functionality for Aeolus (6.2.1)
2/C	27.08.2004	All	Extended UCL Debugger Functionality (6.2.2)
2/D	10.09.2004	All	Bug Fixing for 6.2.2
2/E	22.09.2004	All	Bug Fixing for 6.2.2
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2/G	22.10.2004	All	Final version for 6.2.2 (B14)
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2/I	28.01.2005	All	version for 6.2.3 (B18)
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4/-	18.02.2005	All	Final version for 6.2.3
5/-	11.02.2005	All	version for 6.2.4 (B21)
6/-	22.04.2005	All	Final version for 6.2.4
7/-	03.06.2005	All	version for 6.2.5 (B24)
8/-	03.06.2005	All	Final version for 6.2.5 identical to 7/-
9/-	14.10.2005	All	Final version for 6.3.0_LINUX_B27
10/-	14.10.2005	All	Final version for 6.3.0 identical to 9/-
11/-	06.12.2005	All	version for 6.3.0.1
12/-	03.04.2006	All	version for 6.3.0
13/-	13.10.2006	All	version for 6.3.1
13/-	13.10.2006	All	version for 6.3.1
14	10.11.2006	All	version for 6.3.1.1
15	02.02.2007	All	version for 6.3.1.2
16	13.04.2007	All	version for 6.3.2
17	11.05.2007	All	version for 6.3.3

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1 Introduction

1.1 Identification and Scope

This document is the CGS 6.3.3 SW Release Notes. The release is identified by document CGS SRO [AD 2].

CI Name : CGS SW

CI Number : 1130992

CI Variant : 6.3.3

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1.2 Purpose

The purpose of this software release is a delivery with fixed problems without functional changes.

1.3 Document Layout

This document has the following layout:

Chapter 1 provides the document identification and identifies under which CI this document is prepared. It also identifies the next higher level component CI. Chapter 1 also provides an overview of the purpose of the document and the overall document structure.

Chapter 2 provides the list of documents which are applicable or are referenced.

Chapter 3 provides an overall description of the release. Thus in this chapter all SW products being integrated are listed including the temporary fixes necessary to run the SW. This chapter also provides the identification of CCU versions being used for the SW product integration (if any).

Chapter 4 provides an overview of the release status. This includes a statement on the current test status and the identification of SPRs being fixed with this release.

Chapter 5 provides the installation instruction for the CGS SW.

Appendix A provides a list of abbreviations being used

Appendix B provides a list of terms being used in a certain sense.

Appendix C provides the file listing of the delivery.

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2 Applicable and Reference Documents

CGS Documents:

	name	issue	date
Technical Note			
CGS-RIBRE-TN-0001	CGS SW Release Notes (Linux)	17	11.05.2007
CGS-RIBRE-TN-0002	The CGS Authorization Concept	2/B	04.09.2006
SW Release Order			
CGS-RIBRE-SRO-0006	CGS Software Release Order (Linux)	17	11.05.2007
User Manuals			
CGS-RIBRE-SUM-0001	CGS User Manual	6/-	11.05.2007
CGS-RIBRE-SUM-0002	CGS Installation Manual (Linux)	2/C	08.02.2007
CGS-RIBRE-SUM-0003	MDA Reference Manual	1/D	25.10.2006
CGS-RIBRE-SUM-0004	MDA Administration Manual - see COL	1/-	
CGS-RIBRE-SUM-0005	DADIMA Reference Manual	1	09.11.2001
CGS-RIBRE-SUM-0006	DADIMA Administration Manual	1	09.11.2001
CGS-RIBRE-SUM-0007	GWDU User's and Operations Manual	2	28.08.2006
CGS-RIBRE-MA-0001	UCL Debugger User Manual	1	01.09.2004
CGS-RIBRE-MA-0003	call - A tool to add a graphical user interface to command line based programs	1/-	01.03.2006
CGS-RIBRE-MA-0004	"mdb - MDB Access Tool"	1/-	01.03.2006
CGS-RIBRE-MA-0005	"generate - Text Generation Tool"	1/-	01.03.2006
CGS-RIBRE-MA-0006	CDU Merge Users Manual	1	14.03.2006
CGS-RIBRE-MA-0007	Start Center - A generic user interface for multi-process systems	1/B	30.03.2007
CGS-RIBRE-MA-0008	An XML Based Configuration Concept	1/-	01.10.2006
COL-RIBRE-MA-0018-00	MDA Administration Manual	4/B	31.03.2000
COL-RIBRE-MA-0030-00	MDA Introduction Manual	3/B	04.04.1997
COL-RIBRE-MA-0037-00	DADIMA Introduction Manual	3	04.04.1997
COL-RIBRE-MA-0046	SID Range Tool Users and Operations Manual	1	15.09.1997
Reference Manuals			
CGS-RIBRE-STD-0001	User Control Language (UCL) Reference Manual	3/-	01.12.2005
CGS-RIBRE-STD-0002	High Level Command Language (HLCL) Reference Manual	3/A	04.05.2006
CGS-RIBRE-STD-0003	Virtual Stack Machine and I-Code Reference Manual	3/-	01.12.2005
COL-RIBRE-STD-0008	Reference Manual for Crew Procedure Language and Software, Commanding	1/F	31.10.2001
Requirements Specifications			
CGS-RIBRE-SPE-0001	Columbus Ground System (CGS) Requirement Specification	2/D	23.03.2004
CGS-RIBRE-SPE-0002	CGS Test Case Specification and Test Procedure	4/-	30.08.2006

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Design Documentation

	Columbus Ground System (CGS)		
COL-RIBRE-ADD-0006	Software Architectural Design Document	4/B	30.10.1998

Interface Definitions

CGS-RIBRE-ICD-0001	System to CGS ICD	1/-	31.01.2002
CGS-RIBRE-ICD-0002	MDB Standard Entities and Application Program Interface	1/-	

USS Documents:

	name	issue	date
SW Release Note			
COL-RIBRE-RN-0255	USS 2.12.2 Software Release Document	8	15.05.2007
SW Release Order			
COL-RIBRE-SRO-0615	USS 2.12.2 Software Release Order	1	15.05.2007

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3 Release Overview

3.1 CCU Version Identification

This CGS SW Release provides no mission database content.

3.2 Integrated Products

In following table all SW components are identified necessary to build this release of the CGS SW.

- CGSI
- CLS
- DBS / Command History
- GWDU
- HCI
- MDA / CGS_MDB_V6_3_2
- TES
- TEV
- TSCV
- TSS
- CGS_API

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3.3 Release Media and their Contents

The System is delivered on CD as being identified in Table 1.

Data Carrier ID	*Title / Contents*	*Receiver*
CGS-RIBRE-DC-0219	*CGS_6.3.3_LINUX (Master)*	*Dcc*
CGS-RIBRE-DC-0220	*CGS_6.3.3_LINUX (Backup)*	*GSEtE CM*
CGS-RIBRE-DC-0221	*CGS_6.3.3_LINUX optional (Master)*	*Dcc*
CGS-RIBRE-DC-0222	*CGS_6.3.3_LINUX optional (Backup)*	*GSEtE CM*
CGS-RIBRE-DC-0223	*CGS_6.3.3_LINUX Test SW (Master)*	*Dcc*
CGS-RIBRE-DC-0224	*CGS_6.3.3_LINUX Test SW (Backup)*	*GSEtE CM*
CGS-RIBRE-DC-0225	*CGS_6.3.3_LINUX Debug Executable (Master)*	*Dcc*
CGS-RIBRE-DC-0226	*CGS_6.3.3_LINUX Debug Executable (Backup)*	*GSEtE CM*

Table 1 : Identification of Data Carriers

This delivery contains online documentation only.

3.4 Identification of the Generation and Test Environment

The CGS SW Generation environment is described in chapter 5 of the release notes of ref. [AD 2].

This version is internal identified by PDB checkpoint CGS_6.3.3_B3_LINUX**.**

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4 SW Release Status

4.1 Release Status

The release status is: **FORMAL RELEASE**

The SPRs fixed in this release have been regression tested as documented in the CGS SPRdb.

It has been assessed that the code changes have no impact to the qualification status of other SW modules of CGS as released in former versions.

4.2 Test Status

This CGS SW was tested on commercial baseline. The test status is delta qualified by CGS - AIV.

4.3 Commercial Baseline

- ✓ Suse Linux Enterprise Server 8 / ServicePack3
- ✓ Oracle 9.2.0.5 (remark: for security reasons it is possible to use Oracle 9.2.0.8)
- ✓ Gipsy 4.2.2 based on glibc 2.2
  - with patch for call pr-3437
  - with libdvt11.0.so for Gipsy 4.2.2 / Linux of 14.06.2005
- ✓ Dataviews 9.9
- ✓ CGS API with gnat 5.0.4a
- ✓ CIS CORBA Server built with PrismTech OrbAda 2.7.0 (CORBA 2.5, GIOP 1.2)

This CGS SW release shall be executed on Intel PC with SUSE Linux Enterprise Server 8 (SLES8) based environments.

For using Oracle RAC installation only (see 5.3):

- ✓ Suse Linux Enterprise Server 9 / ServicePack 2
- ✓ Oracle RAC 10gR2 (Version 10.2.0.2)

4.4 Compatibility Statement

The software is based on CGS 6.3.1.

The SAS build with the CGS API (CGS version 6.3.1 / 6.3.2) are compatible to CGS version 6.3.3, but due to some changes inside general packages CGS recommends to recompile the SAS sources with the new CGS API.

The Corba clients build with the CGS IDL (CGS version 6.3.0 / 6.3.1 / 6.3.2) are compatible to CGS version 6.3.3.

4.5 New or Updated Components

All software components are updated.

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4.6 New features in CGS_6.3.3

What's new in CGS_6.3.3 (in difference to CGS 6.3.2)?

4.6.1 CGS DELIVERY

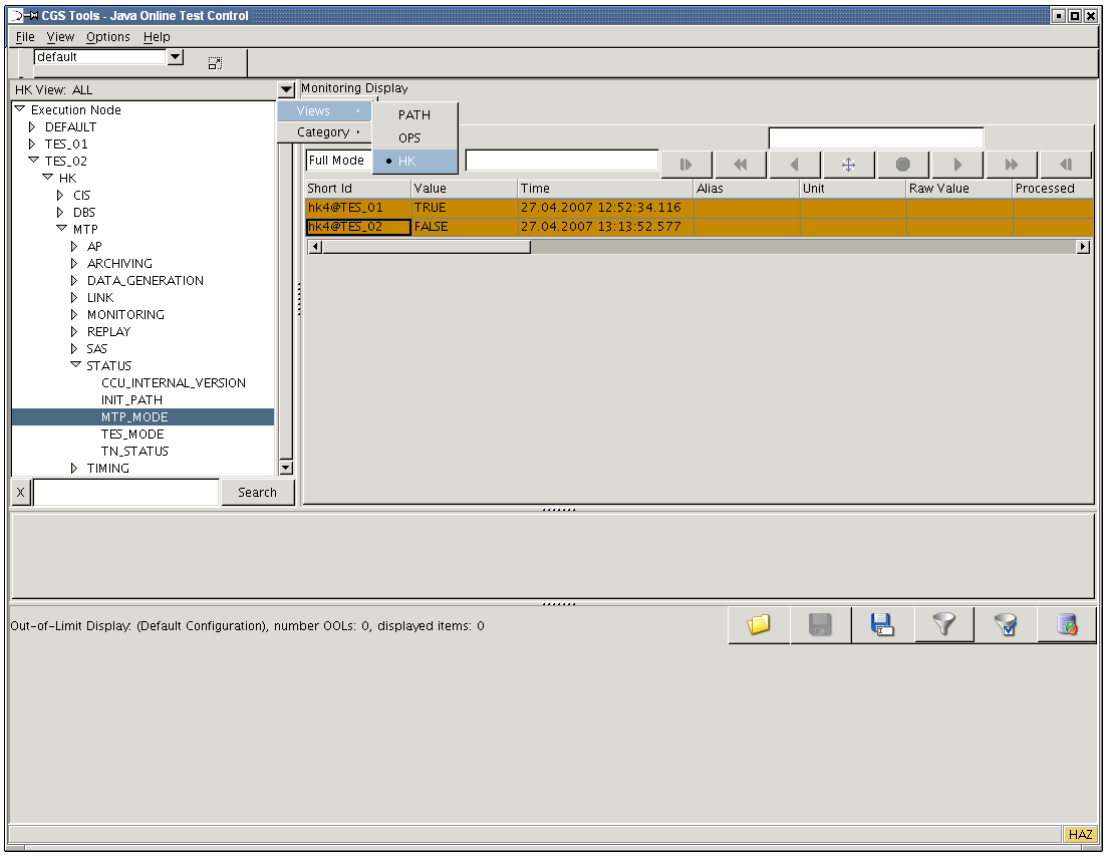
- The complete USS delivery is now on CGS OPTIONAL CD:
  - ✓ **USS FOR SOLARIS-SPARC**
  - ✓ **USS FOR WINDOWS-I586**
  - ✓ **USS FOR LINUX-I586**
  - ✓ **USS EXAMPLES**

  Only the USS for LINUX-I586 will be installed by default. All other distributions or examples are available below CGS optional CD path /archives/uss.

4.6.2 CGS TOOLS

- Access to housekeeping data in distributed environments:

  CGS Tools does now provides access to housekeeping values of all execution nodes. To drag'n drop housekeeping values to the Monitoring Display select Views/HK on the system interface browser.



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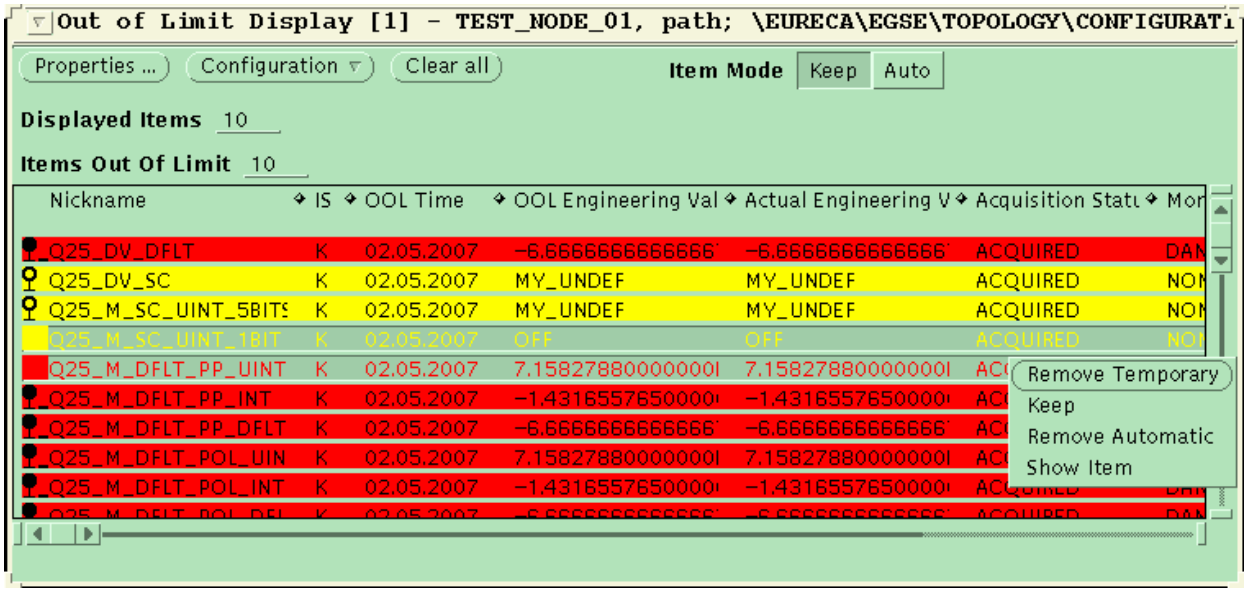
4.6.3 SELECTION OF LINES IN CGS OUT OF LIMIT AND MONITORING WINDOWS

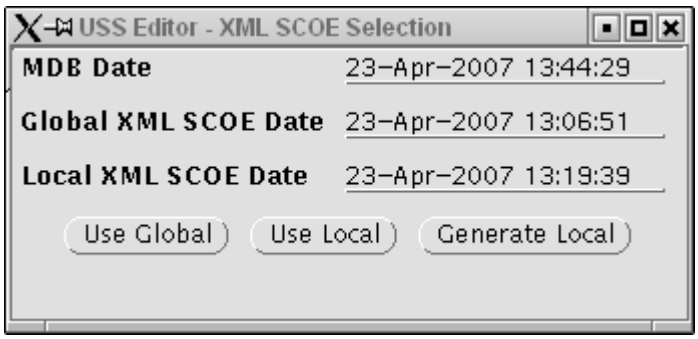
- The solution for SPR-100736 (Color problem in the GO/NOGO Window) inverts the colors of the selected lines for the CGS monitoring window as well as for the out of limit window.



4.6.4 USS EDITOR START FROM CGS

- The USS editor startup from CGS was changed to select (or generate) the correct XML scoe data.

When starting a USS display via context menu or double-click from I_MDB, XML SCOE files can be automatically generated and selected. When starting USS Editor, it checks whether there is an actual SCOE file and ask for confirmation of the generation process if an outdated or none was found (indicated by date "N/A").


USS Editor - XML SCOE Selection
MDB Date 23-Apr-2007 13:44:29
Global XML SCOE Date 23-Apr-2007 13:06:51
Local XML SCOE Date 23-Apr-2007 13:19:39
Use Global
Use Local
Generate Local

If the SCOE files are up to date enough (e.g. if only some enditems have been modified not used by the USS Display), either global or local XML SCOE files can be used if available. If recent modifications of the data base must be avialable, select "Generate Local" to create new XML SCOE files. If actual XML SCOE files are avialable the USS Editor is started directly without displaying the XML SCOE Selection dialog. Quitting the dialog has the same effect as selecting "Use Local". Global XML SCOE files are located at $CGS_HOME/etc/mda/ccu/xml, local XML SCOE files are

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located as defined by property "uss.scoe.dir" in file $GSAF_HOME/uss/main/etc/uss.properties.

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4.7 SW PROBLEM STATUS

4.7.1 SPR Status and Impact Analysis

For this release 47 SPR's are solved.

SPR-16251 Logarithmic scale in graph facility template shown linear
SPR-16646 UCL Debugger: ui-gtk.adb:599 index check failed
SPR-100113 Configuration Editor Has No Icon
SPR-100714 configuration_editor don't accept hidden="false"
SPR-100736 Color problem in the GO/NOGO Window
SPR-100859 HCI hangs in freeze mode
SPR-100916 USS Executor: Remove string "MCS" in connection window
SPR-100950 USS Editor: Problems with the reliability
SPR-101036 Unclear properties naming in the CGS Configuration Editor
SPR-101040 Time not visible at all in monitoring window
SPR-101059 DBS processes not started at the right node during CTM failover
SPR-101068 CIS reconnection/disconnection from TES when USS executor is killed
SPR-101072 JAVA library for CIS clients creates non-unique object IDs
SPR-101080 MCS HCI crashed after closing OOL window (DR3981)
SPR-101083 USS Editor: Failed to open DB end item of type USS User Library
SPR-101121 USS Executer: could not connect to CIS when DNS is not setup for client host lookup
SPR-101147 Printing from TEV not possible
SPR-101158 TP 22: HLCL procedure compiles with errors
SPR-101160 ADU and GDU services not withdrawn after SAS unexpectedly disconnected
SPR-101161 CIS reports during startup: CCU modified after SCOE file generation.
SPR-101169 XML SCOE file generation for USS (A)
SPR-101172 XML SCOE file generation for USS (D)
SPR-101173 After Check_Status the index of the session name is not correct
SPR-101177 storage error in HCI
SPR-101181 CGS Tools: Misleading Error Message When CIS Not Connected
SPR-101183 CLS Batch Compiler should be report an Oracle connection problem
SPR-101184 HLCL Sequence/AP not locked after compile
SPR-101185 Stopped HLCL interpreter ignores changes in dependency status
SPR-101197 Selection of project root folder does not work correctly when invoked from uss executor
SPR-101198 TES generate non unique command ids
SPR-101201 Generate XML SCOE files fails if the uss.properties file contains commented uss.scoe.dir entry
SPR-101202 Command_History increases memory consumption up to 1 GByte
SPR-101203 CGS don't deliver USS for windows
SPR-101205 USS CIS Interface: Exception after CIS Reconnection
SPR-101206 CLS batch compile treats item as already complete in opposite to dependencies tool
SPR-101208 USS 2.12 is missing for CGS 6.3.3
SPR-101209 HCI Crash when operating with (old) OOl Window
SPR-101210 Drag & drop predefined TC does not work for payload USOCs
SPR-101211 TES does't dispatch monitoring status
SPR-101213 cgs startup: missing complete output

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SPR-101216 config tool: upgrade doesn't add old structure
SPR-101222 storage error in HCI
SPR-101223 cgs startup problems, if obsolete tss_conf_file missing
SPR-101229 Icons missing in converted FWDU displays
SPR-101233 CIS reports: CIS_01.PI: [22]: Unable to shutdown recv-task
SPR-101235 Invalid value for OnboardPriority in Command History
SPR-101236 USS Editor cannot store display after MDB re-installation

4.7.2 Temporary Fixed Problems

4.7.3 Further Open Problems

- SPR-100844 - It is not possible to align dynamic string parameter. CGS can handle unaligned parameter only.
- SPR-100868 - SAS linked with the CGS API and using posix.process_primitives.exit_process are hanging. Use the system call _exit (not exit !) instead of posix.process_primitives.exit_process.

4.7.4 Known Restrictions

- It is not possible to prepare a telecommand (SWOP, FLAP, PUS_TC, and TC) via CIS, if this telecommand is defined with garded parameters in the parameter lists.
- Not all interfaces for the new CGS IDL 2.0 are implemented in CGS:

  Note: unsupported `'oneway void'` calls are stubs, just generating a debug message `'<Procedure_Name> -- to be implemented --'` with debug output enabled.

  - not (yet) supported by CGS:
    - Calibration description as telemetry property:
      - not yet supported by CGS: no calibration updates are sent by CIS
    - Telemetry report deliveries:
      - Telemetry data reports not yet supported:
      - `Telemetry.getTelemetryReport` raises `ServiceNotAvailable`.
      - `Telemetry.cancelTelemetryReport` is empty.
      - `TelemetryClient.telemetryReportDelivery` is never called by CIS.

4.7.5 Known Bugs and Workarounds

- Symptom: USS MDB Display Exporter is started twice
- Symptom: Generate SCOE Files reports "Unsupported newer USS file version (N > 3)"

  If an early access version of USS has been integrated by hand, it must be removed. Check if there is a shell script $CGS_HOME/etc/project/pre_generate_scoe_files containing a call to USS_EXPORTER. If USS_EXPORTER is the only reference, remove the complete shell script. If there are other references, remove Only the section containing the code calling USS_EXPORTER.

  ➢ Remove integration of USS Early Access Versions (USS Versions less than 2.6.1).

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5 Installation Procedures

This software shall be used on Intel PC with SUSE Linux Enterpriser Server 8 (SLES8).

5.1 Complete Installation

For a complete installation follow the instructions of CGS installation manual ref. [AD 2].

Remark: The actual CGS installation manual is on CD below /<mountpoint>/doc/manual.

5.2 Patch Installation (based on CGS 6.3.2)

For a patch installation follow the next instructions:

5.2.1 Needed passwords

```
1. <cgsadmin>     (UNIX user)
2. root           (UNIX user)
3. <MDB_ADM>      (oracle user)
```

5.2.2 Installation steps

```
1. login as <cgsadmin> on DB server host

2. cgs shutdown via task_selector / cgs start_center

3. stop command history / central distributor (on command history server)
   in shell: $CGS_HOME/gsaf/dbs/bin/common/stop_cmd_history
   in shell: $CGS_HOME/gsaf/dbs/bin/common/stop_central_distributor

4. quit task_selector / cgs start_center

5. terminate the cgs_daemon
   in shell: killall -9 cgs_daemon

6. insert CGS basic CD CGS_6.3.3

7. mount CD

8. install all products from CD
    in shell: /<mountpoint>/installer.sh

    Select Continue, Continue, Install,           -- for CGS
           Previous, TOOLS,   Continue, Install   -- for TOOLS
           Exit

9. unmount CD

10.  register version
     in shell: vit_manager -upd_item cgs VERSION 6.3.3
```


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11. insert CGS optional CD CGS_6.3.3
    REMARK: This and the next four steps are optional, **but CGS recommends strongly to install gsaf part of optional CD.**

12. mount CD

13. install all optional products from CD
    in shell: /<mountpoint>/installer.sh

    Select Continue, Continue, Install,   -- for CGS optional
           Previous,

    Select for **Installation Source** path /<mountpoint>/addon

           Continue, Install   -- for add-ons (unsupported)
           Exit

14. unmount CD

15. register version
    in shell: vit_manager -upd_item cgs_optional VERSION 6.3.3

16. update the MDB / MDB stored procedures

    in shell:

    $CGS_HOME/patches/CGS_6.3.3/patch_mdb.sh

    -- needs ca. 5 minutes

    verify output: MDB patch successfully installed
    verify output: Temp MDB patch successfully installed

    REMARK: The next command is only necessary for an update of the internal data structure of the MDB (e.g. new data structure delivery for extended databases (user defined data types)). During initialization all user entries in the flexible tool invocation and flexible reports are deleted.

    This command is optional and the usage shall be decided by projects.

    $CGS_HOME/gsaf/mda/config/mdb/install/admin_scripts/initialize_mdb

    $CGS_HOME/gsaf/mda/config/mdb/install/admin_scripts/update_plsql_stored_procedures

    REMARK: The next command is only necessary for a better performance of MDB access.

    This command is optional and the usage shall be decided by projects.

    $CGS_HOME/gsaf/mda/config/mdb/install/admin_scripts/gather_mdb_stats

17. update configuration.xml
    in shell: cd $CGS_HOME/etc/
              cp ./configuration.xml ./configuration.xml.save
              chmod +w ./configuration.xml
              config upgrade ./configuration.xml cgs_configuration_defaults.xml

              config is $CGS_HOME/gsaf/cgsi/bin/linuxi/config

18. update start_center.xml
    in shell: cd $CGS_HOME/etc/
              cp ./start_center.xml ./start_center.xml.save
              chmod +w ./start_center.xml
              config upgrade ./start_center.xml start_center/start_center.xml

19. build your SAS with the new CGS API (not required, **but recommended**)

20. reboot server and if the server is ready, reboot all clients

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5.3 Oracle RAC installation for CGS

5.3.1 Prerequisites

CGS was tested with ORACLE RAC 10gR2 (Version 10.2.0.2) running on SuSE SLES9 SP2. To install CGS on ORACLE 10gR2 Oracle 9.2.5 must be installed on one of the CGS client machines. Also the CGS_HOME directory must be available on this client machine. The installation of the Oracle instance and the CGS tablespaces will not be done with help of CGS installation configurator.

5.3.2 Oracle RAC installation

Follow installation instructions of ORACLE 10gR2. provided by ORACLE

5.3.3 Oracle Database Instance Creation

The database instance used for CGS databases can be created with dbca tool from ORACLE when logged in on the database cluster as ORACLE administrator user. The database can be created from General Purpose database template. Note, that the database must be created with US7ASCII character set! The database must use automatic storage management.

After creation of the database instance the $ORACLE_HOME/network/admin/tnsnames file on the client which will be used for the CGS database installation must be adapted. An example entry is shown below:

```
cgscl1 =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = cgscl1-vip)(PORT = 1521))
    (ADDRESS = (PROTOCOL = TCP)(HOST = cgscl2-vip)(PORT = 1521))
    (LOAD_BALANCE = yes)
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = cldb1.astrium)
      (FAILOVER_MODE =
        (BACKUP = cldb1.astrium)
        (TYPE = SELECT)
        (METHOD = PRECONNECT)
        (RETRIES = 180)
        (DELAY = 5)
      )
    )
  )
```

This adaptation must be done on each CGS client machine which uses the database cluster. After adaptation of the tnsnames file login as CGS Administrator. At first you have to start the CGS configurator and to change the value for the TWO_TASK variable. Save the configuration and create the dotfiles. Logout and again login as CGS Administrator. Check with sqlplus that the new TWO_TASK is working and a correct connection to the cluster dabase can be established.

5.3.4 CGS Tablespace creation

CGS needs tablespaces for the following products:

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- Mission Database
- Result Database
- Command History

The CGS script "create_tablespaces" for the creation of the CGS tablespaceses requires an database which uses ORACLE automatic storage management. The script is located in $CGS_HOME/gsaf/cgsi/config/Oracle/rac. The script needs as parameter the name of the application for which the tablespaces will be created. To create the tablespaces for the mission database login as CGS administrator on the client host and execute the command:

```
cd $CGS_HOME/gsaf/cgsi/config/Oracle/rac/
./create_tablespaces -mdb
```

At next some privileges for the database must be configured. Execute the following commands:

```
cd $CGS_HOME/gsaf/cgsi/config/Oracle/rac/
./create_addational_grants
```

5.3.5 Installation CGS application databases

When using RAC the CGS databases will not be installed with help of CGS installation configurator. The installation scripts must be executed on command line. The mission database can be installed by executing the following commands on the client machine as CGS administrator:

```
$CGS_HOME/gsaf/mda/config/mdb/install/admin_scripts/install_mdb
$CGS_HOME/gsaf/mda/config/mdb/install/admin_scripts/initialize_mdb
```

The result database can be installed by executing the following commands on the client machine as CGS administrator:

```
$CGS_HOME/gsaf/dbs/util/common/install_trdb rac
```

The database for the command history application can be installed by executing the following commands on the client machine as CGS administrator:

```
$CGS_HOME/gsaf/dbs/util/common/command_history/install_cmd_history rac
```

Beginning from now the normal CGS installation actions can be followed.

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6. Acronyms

AD	Applicable Document
ADD	Architectural Design Document
AP	Automated Procedure
ASCII	Americal Standard Code for Information Interchange
ATP	Authorization to Proceed
ATV	Autonomous Transfer Vehicle
CCB	Configuration Control Board
CCU	Configuration Control Unit
CCSDS	Consultative Commitee for Space Data System
CGS	Core Ground System
CDU	Configuration Data Unit
CLS	CGS Language System
COTS	Commercial Off-The-Shelve
CPL	Crew Procedure Language
CPU	Central Processing Unit
D&D	Design and Development
DMS	Data Management System
DOF	Degree of Freedom
EGSE	Electrical Ground Support Equipment
EM	Engineering Model
EQM	Engineering Qualification Model
ESA	European Space Agency
ETM	Electrical Test Model
FDIR	Fault Detection, Isolation and Recovery
FM	Flight Model
GMT	Greenwich Mean Time
GNC	Guidance Navigation Control
GPS	Global Positioning System
HCI	Human-Computer Interface
HL	High Level
HLCL	High Level Command Language
HW	Hardware
ICD	Interface Control Document
IF	InterFace
ISS	International Space Station
LL	Low Level
MDB	Mission Database
MET	Mission Elapsed Time
MMS	Matra Marconi Space
N/A	Not Applicable
PDB	Project Data Base
PROM	Programmable Read Only Memory
RAM	Random Access Memory
RD	Reference Document
RFW	Request for Waiver
ROM	Read Only Memory
RV	RendezVous
S/C	SpaceCraft
SCCB	Software Configuration Control Board
SOC	Statement of Compliance
SPR	Software Problem Report
SRD	Software Requirements Document

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SUM	Software User Manual
SW	SoftWare
SWRU	Software Replaceable Unit
TBC	To Be Confirmed
TBD	To Be Defined
TC	TeleCommand
TM	TeleMetry
TRR	Test Readiness Review
UCL	User Control Language
URD	User Requirements Document
UTC	Universal Time Coordinated
VCD	Verification Control Document
VTP	Validation Test Plan

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